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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,469	01/13/2006	Soichi Shibata	043888-0432	9397

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EXAMINER	
RADEMAKER, CLAIRE L	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/564,469	SHIBATA ET AL.	
	Examiner	Art Unit	
	CLAIRE L. RADEMAKER	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action is in response to the amendment filed on April 2, 2008. Claims 1 and 4 are pending and are rejected for reasons of record.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito (JP 11-354143) in view of Imamura et al. (US 2004/0038098) and Meltser et al. (US 2004/0137258) and Simpson et al. (US 2004/0197614).

With regard to claim 1, Saito teaches a fuel cell system (paragraph [011]; Figure 1) comprising a fuel cell (20, paragraph [0011]; Figure 1), a fuel gas supply means (1, paragraph [0012]; Figure 1) for supplying a fuel gas to an anode of said fuel cell, an oxidant gas supply means (8, paragraph [0015]; Figure 1) for supplying an oxidant gas to a cathode of said fuel cell, and an inert gas supply means (32, paragraph [0016]; Figure 1) for supplying an inert gas to the anode of said fuel cell (paragraphs [0008], [0010], [013], & [0017]; Figure 1), where said fuel cell is subjected to a purge operation of replacing the fuel gas and in said fuel cell with an inert gas supplied from said inert

gas supply means when said fuel cell is started up or shut down (paragraphs [0008], [0010], [013], & [0017]), wherein said fuel cell system further comprises control means (46, paragraph [0016]; Figure 1) for controlling the flow rate of the purge gas supplied to said fuel cell (paragraph [0016]; Figure 1), but fails to teach a means for measuring pressure at the inlet-side flow paths leading to the anode and the cathode of said fuel cell, the specified relationship between the pressures at the anode inlet-side and cathode inlet-side during normal operation or during purging, the specified relationship between the pressure differentials during purge operation and during normal operation, or a means for variably controlling the flow rate of the purge gas.

Imamura et al. and Saito are considered analogous art because they both involve the same field of endeavor: fuel cell systems.

Imamura et al. teaches means for measuring a pressure P_a in an inlet-side flow path leading to the anode of said fuel cell (81, paragraph [0120]; Figure 9) and a pressure P_c in an inlet-side flow path leading to the cathode (71, paragraph [0120]; Figure 9) in order to better control the pressure and thereby limit the water diffusion from the air electrode side through the electrolyte membrane to the fuel electrode side (paragraph [0058]), wherein the differential pressure ΔP can be defined as $\Delta P = P_a - P_c$ (paragraphs [0057]-[0058]), thereby preventing the water residence around the electrode portions of the fuel electrode (paragraph [0058]), but fails to specifically state that $0 < \Delta P_o$.

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the means for measuring pressures at the inlet-side flow paths leading

to the anode and the cathode of Imamura et al. to the fuel cell system of Saito in order better control the pressure and thereby limit the water diffusion from the air electrode side through the electrolyte membrane to the fuel electrode side (paragraph [0058]). Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of the pressure at the inlet-side of the anode being greater than the pressure at the inlet-side of the cathode of Imamura et al. during normal operation to the fuel cell system of Saito in order to prevent water residence around the electrode portions of the fuel electrode (paragraph [0058]).

While modified Saito fails to specifically state that $0 < \Delta P_o$, one of ordinary skill in the art would understand that because ΔP can be defined as $\Delta P = P_a - P_c$ where $P_a > P_c$ (Imamura et al., paragraphs [0057]-[0058]), ΔP_o can be greater than 0 (zero).

Modified Saito fails to teach that $0 < \Delta P_p$.

Meltser et al. teaches the concept of controlling the pressure differential between the anode and the cathode of a fuel cell during purging operation (paragraph [0021]) where the pressure at the anode is greater than the pressure at the cathode (paragraph [0021]) in order to prevent and/or minimize possibility of membrane separation (paragraph [0021]).

Meltser et al. and Saito are considered analogous art because they involve the same field of endeavor: fuel cell systems.

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of controlling the pressure differential between the anode and the cathode where the pressure at the anode is greater than the pressure at the

cathode of Meltser to the modified fuel cell system of Saito in order to prevent and/or minimize possibility of membrane separation during purging (paragraphs [0021] & [0005]).

While modified Saito fails to specifically state that $0 < \Delta P_p$, one of ordinary skill in the art would understand that because ΔP can be defined as $\Delta P = P_a - P_c$ where $P_a > P_c$ (Meltser et al., paragraph [0021]), ΔP_p can be greater than 0 (zero).

Modified Saito fails to specifically state that $0 < \Delta P_o * \Delta P_p$ or that $|\Delta P_p| \leq |\Delta P_o|$.

While modified Saito fails to specifically state that $0 < \Delta P_o * \Delta P_p$, one of ordinary skill in the art would understand that that because ΔP_o can be greater than 0 (zero) (see above) and because ΔP_p can be greater than 0 (zero) (see above), the product of ΔP_o and ΔP_p can be greater than 0 (zero).

Furthermore, while modified Saito fails to specifically state that the differential pressure during purging ($|\Delta P_p|$) is less than or equal to the differential pressure during normal operation ($|\Delta P_o|$), it would have been obvious to one of ordinary skill in the art at the time of the invention to maintain the differential pressure during purging ($|\Delta P_p|$) at or lower than the differential pressure during normal operation in order to prevent water residence around the electrode portions of the fuel electrode (Imamura et al, paragraph [0058]) and prevent and/or minimize possibility of membrane separation (Meltser et al., paragraph [0021]).

Imamura et al. and Meltser et al. are both teaching that the differential pressure during normal operation and during purging are result effective variables. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to

optimize the differential pressures during purging and during operation because the courts have held that optimization of a results effective variable is not novel. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Modified Saito fails to teach a means for variably controlling the flow rate of the purge gas.

Simpson et al. teaches a fuel cell system (paragraph [0017]; Figure 1) comprising a means for variably controlling the flow rate of a purge gas (72, paragraphs [0045], [0049]-[0050], & [0039]; Figure 1) in order to maintain the desired pressure in the fuel cell system.

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the means for variably controlling the flow rate of the purge gas of Simpson et al. to the fuel cell system of modified Saito in order to maintain the desired pressure in the fuel cell system.

With regard to claim 4, modified Saito fails to teach means for changing the internal diameter of an outlet-side flow path of an exhaust gas.

Simpson et al. teaches a fuel cell system (paragraph [0017]; Figure 1) comprising a means for changing the internal diameter of an outlet-side flow path of an exhaust gas from said fuel cell at least in stages (52 & 72, paragraphs [0045], [0049]-[0050], & [0039]; Figure 1) based on the values of Pa and Pc during the purge operation of said fuel cell (paragraphs [0045] & [0049]-[0050]) in order to maintain the desired pressure in the fuel cell system.

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the means for changing the internal diameter of an outlet-side flow path of an exhaust gas from said fuel cell at least in stages based on the values of Pa and Pc during purge operation of said fuel cell of Simpson et al. to the fuel cell system of modified Saito in order to maintain the desired pressure in the fuel cell system.

Response to Arguments

Specification

4. Applicant's arguments with regard to the objections to the Specification regarding the title of the application, filed on April 2, 2008, have been fully considered and the Examiner's objections are withdrawn due to the Applicant's amendments and arguments.

Claim Rejections - 35 USC § 103

5. Applicant's arguments with respect to claims 1 & 4, filed on April 2, 2008, have been considered but are moot in the view of the new grounds of rejection. The new grounds of rejection are necessitated by the Applicants amendment and all arguments are directed toward the added features of (1) means for variably controlling the flow rate of the inert gas supplied to the fuel cell based on the values of Pa and Pc during the purge operation of said fuel cell, and (2) means for changing the internal diameter of an

outlet-side flow path of an exhaust gas from said fuel cell at least in stages based on the values of Pa and Pc during the purge operation of said fuel cell.

On pages 6-7 of the Applicant's Response, Applicants argue that Saito, Imamura, and Meltser do not "disclose preventing a reversal of the relation between Pa and Pc" (Applicant's Response, page 6) and that therefore "the limitations recited in the last paragraph of claim 1 are not obvious in view of the combination of Saito, Imamura, and Meltser" (Applicant's Response, page 7).

The Examiner respectfully disagrees with the Applicants argument that the concept of having $0 < \Delta P_o * \Delta P_p$ is not obvious because Imamura et al. teaches that ΔP during normal operation can be defined as $\Delta P = P_a - P_c$ where $P_a > P_c$ (Imamura et al., paragraphs [0057]-[0058]), thereby allowing ΔP_o to be greater than 0 (zero) and Meltser et al. teaches that ΔP during purging can be defined as $\Delta P = P_a - P_c$ where $P_a > P_c$ (Meltser et al., paragraph [0021]), thereby allowing ΔP_p to be greater than 0 (zero). Therefore, one of ordinary skill in the art would understand that that because ΔP_o can be greater than 0 (zero) (see above) and because ΔP_p can be greater than 0 (zero) (see above), the product of ΔP_o and ΔP_p can be greater than 0 (zero).

In response to the Applicant's argument on pages 7-8 of the Applicant's Response that "Imamura does not disclose "controlling the flow rate of the inert gas… based on the values of Pa and Pc" (Applicant's Response, page 8), the Examiner notes

that this argument is moot because Meltser et al. is no longer used to reject this limitation due to the added limitation of a means for changing the internal diameter of an outlet-side flow path of an exhaust gas from said fuel cell at least in stages based on the values of Pa and Pc during the purge operation of said fuel cell.

Conclusion

6. The prior art made of record and not relied upon which is considered pertinent to applicant's disclosure is as follows: Kamihara (US 2005/0244686) discloses a fuel cell system comprising a means to variably control the flow rate of the purge gas supplied to said fuel cell and a means for changing the internal diameter of an outlet-side flow path of an exhaust gas from said fuel cell at least in stages; Iio et al. (US 6,663,990 discloses a fuel cell system comprising a means for variably controlling the flow rate of a purge gas and a means for changing the internal diameter of an outlet-side flow path of an exhaust gas from said fuel cell at least in stages.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CLAIRE L. RADEMAKER whose telephone number is (571)272-9809. The examiner can normally be reached on Monday - Friday, 8:00AM - 4:30PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. L. R./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795